

**Lampiran 1.** Biodata ketua dan anggota tim pengusul

**BIODATA KETUA PENELITI**

**I. IDENTITAS DIRI**

1.1.	Nama Lengkap (dengan gelar)	Dr. Ir. Tatang Sopandi, MP	L/P
1.2 .	Jabatan Fungsional	Lektor Kepala	
1.3.	NIP/NIK/No Identitas lainnya	19630704 199311 1 001	
1.4.	Tempat dan tanggal lahir	Bandung, 4 Juli 1963	
1.5.	Alamat rumah	Jl. Merpati VIII MB-6 Sidoarjo	
1.6	Nomor Telepon/Fax		
1.7	Nomor HP	081231681744	
1.8	Alamat kantor	Jl. Ngagel Dadi III Surabaya	
1.9	Nomor Telepon/fax		
1.10	Alamat e-mail	<a href="mailto:tatang_sopandi@yahoo.co.id">tatang_sopandi@yahoo.co.id</a>	
1.11	Lulusan yang dihasilkan	S1 = 45 orang; S2= - orang; S3= - orang	
1.12	Mata kuliah yang diampu	1. Mikologi 2. Mikrobiologi Pangan 3. Teknologi Hasil Pertanian 4. Biologi 5. Metodologi Penelitian	

**II. RIWAYAT PENDIDIKAN**

2.1.	Program	S1	S2	S3
2.2	Nama PT	UNPAD	UNPAD	UNAIR
	Bidang Ilmu	Peternakan	Ilmu Tanaman	Biologi
2.4	Tahun Masuk	1983	1995	2007
2.5	Tahun Lulus	1990	1998	2011
2.6	Judul skripsi	Korelasi genetic dan fenotifik produksi susu laktasi pertama dengan MPPA pada sapi perah Fries Holland		
	Tesis	Daya awet daging ayam broiler yang direndam dalam natrium laktat		
	Disertasi	Penicillium lokal Baluran penghasil biopigmen dalam media tongkol jagung		
2.7	Nama Pembimbing/Promotor	Dr. Dudung Mulyadi , Prof. Dr. Udju D Rusdi, Prof. Dr. Ami Suwandi		

**III. PENGALAMAN PENELITIAN (5 tahun terakhir)**

No	Tahun	Judul Penelitian	Pendanaan	
			Sumber	Jml (juta Rp)
1	2017	Potensi butiran kering distilat produk ikutan produksi bioethanol oleh kultur <i>Saccharomyces cereviciae</i> dengan <i>Candida tropicalis</i> dari sekam padi sebagai pakan unggas Tahun ke-1	DPRM Hibah Penelitian Berbasis Kompetensi	98

2	2017	Penggunaan Pakan Fungsional Immunostimulan dan Penurun Kolesterol Telur Berbasis Serbuk Daun Seligi Guna Mengatasi Kendala Ketergantungan Pakan dan Tingginya Mortalitas pada Puyuh Tahun Ke-3	Hibah Strategis Nasional	85
3	2016	Pengembangan produksi bioethanol dalam media lignoselulosa sekam padi dengan ko-kultur <i>Saccharomyces cerevisiae</i> dan mikroorganisme lain penghasil bioethanol. Tahun Ke-3	Hibah Kompetensi	110
4	2016	Penggunaan Pakan Fungsional Immunostimulan dan Penurun Kolesterol Telur Berbasis Serbuk Daun Seligi Guna Mengatasi Kendala Ketergantungan Pakan dan Tingginya Mortalitas pada Puyuh. Tahun Ke-2	Hibah Strategis Nasional	85
5	2015	Pengembangan produksi bioethanol dalam media lignoselulosa sekam padi dengan ko-kultur <i>Saccharomyces cerevisiae</i> dan mikroorganisme lain penghasil bioethanol. Tahun Ke-2	Hibah Kompetensi	120
6	2015	Penggunaan Pakan Fungsional Immunostimulan dan Penurun Kolesterol Telur Berbasis Serbuk Daun Seligi Guna Mengatasi Kendala Ketergantungan Pakan dan Tingginya Mortalitas pada Puyuh. Tahun Ke-1	Hibah Strategis Nasional	86
7	2014	Pengembangan produksi bioethanol dalam media lignoselulosa sekam padi dengan ko-kultur <i>Saccharomyces cerevisiae</i> dan mikroorganisme lain penghasil bioethanol. Tahun Ke-1	Hibah Kompetensi	100
8	2013	<i>Portable Compact Reactors Water Treatment</i> Berbasis Zeolit Dan <i>Ion Exchange</i> Terpadukan Dengan <i>Reverse Osmosis (RO)</i> Guna Mengatasi Kesulitan Air Layak Minum Masyarakat Pesisir”	Hibah Strategis Nasional	100
9	2012	Potensi serbuk daun seligi ( <i>Phyllanthus buxyfolius</i> ) sebagai antihiperlipidemik alami berbasis herbal penurun kolesterol daging ayam broiler	Fundamental Riset	34
10	2011	Kapasitasi serbuk daun seligi ( <i>Phyllanthus buxyfolius</i> ) sebagai immunostimulan herbal penurun kolesterol daging ayam broiler	Fundamental Riset	34

11	2010	Karakteristik dan toksisitas pigmen yang diproduksi oleh <i>Penicillium purpurogenum</i>	Fundamental Riset	39
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#### IV. PENGALAMAN PENGABDIAN KEPADA MASYARAKAT

No	Tahun	Judul Pengabdian kepada masyarakat	Pendanaan	
			Sumber	Jml (juta Rp)
1	2015	IbM Formulasi dan Pembuatan Pakan Puyuh Menuju Kemandirian Peternak di Desa Sumberingin, Kec. Sanankulon, Kab. Blitar	DP2M Dikti	50
2	2007	Program Pemberdayaan Perempuan Pengembang Ekonomi Lokal (P3EL)	Propinsi Jawa Timur	45
3	2006	Penerapan Teknologi Pengolahan Pangan dalam Pembuatan Makanan Ringan Berbahan Baku Jamur Tiram Putih ( <i>Pleurotus ostratus</i> ).	Penerapan IPTEKS	10
4	2007	Fermentasi Nata de Coco dengan Pengkayaan rasa menggunakan sari buah Di Tajinan Kabupaten Malang.	Dinas Koperasi Propinsi Jawa Timur	15

#### V. PENGALAMAN PENULISAN ARTIKEL ILMIAH DALAM JURNAL

No	Tahun	Judul Artikel ilmiah	Nama Jurnal	Volume/ Nomor
1	2017	Ethanol production and sugar consumption of co-culture <i>Saccharomyces cerevisiae</i> FNCC 3012 with <i>Candida tropicalis</i> FNCC 3033 in media containing inhibitor fermentation	Journal of Microbiology, Biotechnology, and Food Science	Vol. 7. No. 2. October-November 2017, Hal. 160-167
2	2016	Egg Cholesterol and Immunity of Quail ( <i>Coturnix coturnx japonica</i> ) Diet <i>Phyllanthus buxifolius</i> Leaves Feed Supplement	Asian Journal of Agricultural Research	Vol.10. No. (2); 2016; 114-125
3	2015	Sugar consumption in mono and co-culture <i>Saccharomyces cerevisiae</i> and others selected microorganism for bioethanol production from stream rice husk medium	Asian Journal of Microbioly. Biotechnology and Environ. Science.	Vol. 17, No. (3) : 2015 : 577-586
4	2014	Removal parameters of clean water using treatment sediment poly propylene, carbon block, manganese zeolite, ion exchange, and reverse osmosis (RO)	Journal of Environmental and earth science	Vol. 4. No. 23 (2014)

5	2013	Utilization and optimization of a waste stream cellulose culture medium for pigment production by <i>Penicillium</i> spp.	Journal Applied Microbiology	Vol. 114. No. 3:733-45. doi: 10.1111/jam.12110
6	2012	Sub Acute Toxicity Pigment Derived from <i>Penicillium resticulosum</i> in Mice.	Jurnal Mikrobiology Indonesia.	Vol. 6 No. 1.
7	2012	Reduction of Intracellular Lipid Accumulation, Serum Leptin and Cholesterol Levels in Broiler Fed Diet Supplement with Powder Leaves of <i>Phyllanthus buxifolius</i> .	Asian Journal Agriculture Research. DOI: 10.3923/ajar.2012	Vol. 6 No.3
8	2008	Stabilitas dan Toksisitas Pewarna dari Ekstrak Air Kulit Buah Naga ( <i>Hylocereus</i> spp).	Jurnal Obat Bahan Alam	Vol. 7 No.1
9	2007	Identifikasi senyawa aktif ekstrak bioetanol daun seligi dan pengaruhnya terhadap gambaran serolgi dan hematologi ayam broiler yang diinfeksi oleh virus Newcastle	Jurnal Obat Bahan Alam	Vol. 6. No. 2
10	2007	Aktivitas antioksidan in vitro dan hepatoprotektor fraksi iridoid rumput mutiara pada hati kelinci yang terpapar asetaminophen	Jurnal Obat Bahan Alam.	Vol. 6. No. 2
11	2006	Iridoid rumput mutiara ( <i>Hedyotis corymbosa</i> , Lamk). sebagai anti-hepatotoksik terhadap kerusakan hati akibat acetaminophen.	Jurnal Saintek.	Vol. 10. No. 2
12	2006	Efek ekstrak daun seligi ( <i>Phyllanthus buxifolius</i> Muell) terhadap leukosit serta kadar limfosit dan neutrofil darah kelinci yang terinfeksi bakteri <i>Escherichia coli</i> .	Jurnal Saintek.	Vol. 10. No. 1

## VI. PENGALAMAN PENULISAN BUKU

No	Tahun	Judul Buku	Jumlah halaman	Penerbit
1	2014	Mikrobiologi Pangan	423	ANDI Offset
2	2016	Teknologi Hasil Pertanian	178	Revka Petra Media
3	2016	Formulasi dan Pembuatan Pakan Puyuh	20	UNTAG Press
4	2017	Industri Kerakyatan	271	Zifatama Jawara

## VI. PENGALAMAN PEROLEHAN HAKI

No	Tahun	Judul/Tema HAKI	Jenis	Nomor Pendaftaran/Sertifikat
1	2016	Proses Pengolahan Air Payau	Paten Sederhana	Paten Seri-A. No. BRP485/IV/2016
2	-	-	-	-

## VII. PENGALAMAN RUMUSAN KEBIJAKAN PUBLIK/REKAYASA SOSIAL LAINNYA

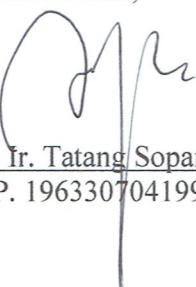
No	Tahun	Judul/Tema/Jenis Rekayasa Sosial Lainnya yang telah diterapkan	Tempat Penerapan	Respon Masyarakat
1	2007	Peningkatan Ekonomi Keluarga Melalui Pemberdayaan Perempuan Pengembang Ekonomi Lokal	Provinsi Jawa Timur	Baik
2	2007	Pengkayaan Rasa Produk Nata de Coco dengan Sari Buah	Tajinan, Kabupaten Malang	Baik
3	2017	Aplikasi Teknologi Tepat Guna Peternakan	Surabaya	Baik

Semua data yang saya isikan dan tercantum dalam biodata ini adalah benar dan dapat dipertanggung jawabkan secara hukum. Dan apabila dikemudian hari ternyata dijumpai ketidak sesuaian dengan kenyataan, saya sanggup menerima resikonya.

Demikian biodata ini, saya buat dengan sebenarnya untuk memenuhi persyaratan sebagai salah satu syarat pengajuan hibah penelitian kompetensi.

Surabaya, 11 September 2018

Ketua Peneliti,

  
Dr. Ir. Tatang Sopandi., MP  
NIP. 1963307041993111001

## BIO DATA ANGGOTA PENELITI

### I. IDENTITAS DIRI

1	Nama Lengkap (dengan gelar)	Dr. Ir. Wardah, MP., MM
2	Jenis Kelamin	L/P
3	Jabatan Fungsional	Lektor Kepala
4	NIP	196107081989032001
5	NIDN	0008076101
6	Tempat dan tanggal lahir	Lamongan, 8-7-1961
7	E-mail	<a href="mailto:wardahassery@yahoo.co.id">wardahassery@yahoo.co.id</a>
8	Alamat rumah	Jl. Merpati VIII MB-6 Pabean Sidoarjo
9	Nomor Telepon/HP	031-72424770 / 085232500848
10	Alamat kantor	Jl. Semolowaru 45 Surabaya
11	Nomor Telepon/fax	031-5931800/031-5929767
12	Lulusan yang telah dihasilkan	S1 = 60 orang; S2= - orang; S3= - orang
13	Mata kuliah yang diampu	1. Termobakteriologi 2. Ilmu Kealaman Dasar 3. Teknologi Tanaman Obat 4. Mikrobiologi Pangan dan Pengolahan 5. Metodologi Penelitian 6. Teknologi Hasil Ternak

### II. RIWAYAT PENDIDIKAN

2.1.	Program	S1	S2	S3
2.2	Nama PT	UB	UNPAD	UNAIR
	Bidang Ilmu	Peternakan	Ilmu Tanaman	Biologi
2.4	Tahun Masuk	1982	1996	2008
2.5	Tahun Lulus	1987	1999	2012
2.6	Judul skripsi	Ripitabilitas fertilitas dan daya tetas ayam petelur (Parent stock)		
	Tesis	Daya awet daging sapi pada berbagai suhu penyimpanan		
	Disertasi	Potensi serbuk daun seligi sebagai <i>feed supplement</i> alami untuk memperbaiki profil leptin dan karakteristik fisiologis sebagai upaya menghasilkan daging ayam broiler rendah lemak dan kolesterol		
2.7	Nama Pembimbing/Promotor	Dr. Widji Widodo	Prof. Dr. Suharsono	Prof. Dr. Kusriningsrum

### III. PENGALAMAN PENELITIAN DALAM 5 TAHUN TERAKHIR

No	Tahun	Judul Penelitian	Pendanaan	
			Sumber	Jml (juta Rp)
1	2017	Penggunaan Pakan Fungsional Immunostimulan dan Penurun Kolesterol Telur Berbasis Serbuk	Hibah Strategis	85

		Daun Seligi Guna Mengatasi Kendala Ketergantungan Pakan dan Tingginya Mortalitas pada Puyuh Tahun Ke-3	Nasional	
2	2017	Potensi butiran kering distilat produk ikutan produksi bioethanol oleh ko-kultur <i>Saccharomyces cereviceae</i> dengan <i>Candida tropicalis</i> dari sekam padi sebagai pakan unggas Tahun ke-1	DPRM Hibah Penelitian Berbasis Kompetensi	98
3	2016	Penggunaan Pakan Fungsional Immunostimulan dan Penurun Kolesterol Telur Berbasis Serbuk Daun Seligi Guna Mengatasi Kendala Ketergantungan Pakan dan Tingginya Mortalitas pada Puyuh Tahun Ke-2	Hibah Strategis Nasional	85
4	2016	Pengembangan Produksi Biobioetanol dalam Media Lignoselulosa Sekam Padi dengan Ko-kultur ( <i>S. Cerevisiae</i> ) dan Mikroorganisme Penghasil Biobioetanol Lain. Tahun Ke-3	Hibah Kompetensi	110
5	2015	Penggunaan Pakan Fungsional Immunostimulan dan Penurun Kolesterol Telur Berbasis Serbuk Daun Seligi Guna Mengatasi Kendala Ketergantungan Pakan dan Tingginya Mortalitas pada Puyuh Tahun Ke-1	Hibah Strategis Nasional	86
6	2015	Pengembangan Produksi Biobioetanol dalam Media Lignoselulosa Sekam Padi dengan Ko-kultur ( <i>S. Cerevisiae</i> ) dan Mikroorganisme Penghasil Biobioetanol Lain. Tahun Ke-2	Hibah Kompetensi	120
7	2014	Pengembangan Produksi Biobioetanol dalam Media Lignoselulosa Sekam Padi dengan Ko-kultur ( <i>S. Cerevisiae</i> ) dan Mikroorganisme Penghasil Biobioetanol Lain. Tahun Ke-1	Hibah Kompetensi	100
8	2012	Potensi serbuk daun seligi ( <i>Phyllanthus buxyfolius</i> ) sebagai antihiperlipidemik alami berbasis herbal penurun kolesterol daging ayam broiler	Fundamental Riset	34
9	2011	Kapasitasi serbuk daun seligi ( <i>Phyllanthus buxyfolius</i> ) sebagai immunostimulan herbal penurun kolesterol daging ayam broiler	Fundamental Riset	34
10	2010	Biokonversi Sekam dan Jerami Padi Menjadi Gula Solubel dan Zat Warna oleh <i>Penicillium Purpurogenum</i> (Tahun II)	Fundamental Riset	39

#### **IV. PENGALAMAN PENGABDIAN KEPADA MASYARAKAT DALAM 5 TAHUN TERAKHIR**

No	Tahun	Judul Pengabdian kepada Masyarakat	Pendanaan	
			Sumber	Jml (juta Rp)
1	2015	IbM Formulasi dan Pembuatan Pakan Puyuh	DP2M Dikti	50

		Menuju Kemandirian Peternak di Desa Sumberingin, Kec. Sanankulon, Kab. Blitar		
2	2015	Iptekda LIPI Pengingkatan Ekonomi Melalui Penggemukan Sapi Potong dengan Teknologi Fermentasi Pakan Ternak pada Kelompok Tani Ternak UNGGUL di Desa Mojomalang, Kec. Parengan, Kab. Tuban	LIPI	250
3	2014	Pembimbing Klinik Proposal Penelitian dan Pengabdian Masyarakat LPPM Untag Surabaya	LPPM	1
4	2014	Penyuluhan Tema “Keamanan Pangan” pada Siswa siswi SMA 17 Agustus 1945 Surabaya	LPPM	1
5	2014	Pemantau Pelaksanaan KKN semester Gasal 2013/2014	LPPM dan Fak. Ekonomi	2
6	2008	Penyuluhan Produk Berbasis Singkong di Kab. Mojokerto	LPPM dan FIP	2
7	2007	Pendampingan Program Pemberdayaan Perempuan Pengembang Ekonomi Lokal (P3EL)	Bapemas Propinsi Jawa Timur	45
8	2006	Pendampingan Program Pemberdayaan Perempuan Pengembang Ekonomi Lokal (P3EL)	Bapemas Propinsi Jawa Timur	50

## V. PUBLIKASI ARTIKEL DALAM JOURNAL DALAM 5 TAHUN TERAKHIR

No.	Judul Artikel Ilmiah	Nama Jurnal	Volume/Nomor /Tahun
1	Identifikasi senyawa aktif ekstrak bioetanol daun seligi dan pengaruhnya terhadap gambaran serologi dan hematologi ayam broiler yang diinfeksi oleh virus Newcastle	Jurnal Obat Bahan Alam.	Vol. 6/No. 2./2007
2	Stabilitas dan Toksisitas Pewarna dari Ekstrak Air Kulit Buah Naga ( <i>Hylocereus spp.</i> )	Jurnal Obat Bahan Alam	Vol. 7/No. 1/2008
3	Sub Acute Toxicity Pigment Derived from <i>Penicillium resticulosum</i> in Mice	Jurnal Mikrobiology Indonesia.	Vol. 6 /No. 1./2012
4	Reduction of Intracellular Lipid Accumulation, Serum Leptin and Cholesterol Levels in Broiler Fed Diet Supplemented with Powder Leaves of <i>Phyllanthus buxifolius</i>	Asian Journal Agriculture Research. DOI: 10.3923/ajar.2012.106.117	Vol. 6/No.3/2012
5	Utilization and optimization a stream waste cellulose for pigmen production by <i>Penicillium spp</i>	Journal Applied Microbiology	Vol. 114 /No. 3/ 2013

6	Sugar Consumption in Mono and C0-Culture <i>S. cerevisiae</i> and Others Selected Microorganism for Bioethanol Production from Stream Rice Husk Medium	Asian Journal of Microbiology, Biotechnology and Environmental Science.	Vol. 13/ No. 3/2014
7	Egg Cholesterol and Immunity of Quail ( <i>Coturnix coturnix japonica</i> ) Diet <i>Phillanthus buxifolius</i> Leaves Feed Supplement	Asian Journal of Microbiol. Biotechnology and Environ. Science.	Vol.10. No. (2); 2016; 114-125
8	Ethanol production and sugar consumption of co-culture <i>Saccharomyces cerevisiae</i> FNCC 3012 with <i>Candida tropicalis</i> FNCC 3033 in media containing inhibitor fermentation	Journal of Microbiology, Biotechnology, and Food Science	Vol. 7. No. 2. October-November 2017, Hal. 160-167

## VI. KARYA BUKU DALAM 5 TAHUN TERAKHIR

No	Judul Buku	Tahun	Jumlah Halaman	Penerbit
1	Mikrobiologi Pangan	2014	423	ANDI Offset
2	Teknologi Pangan	2015	250	UNTAG Press
3	Formulasi dan Pembuatan Pakan Puyuh	2015	20	UNTAG Press

## VII. PENGALAMAN MERUMUSKAN KEBJAKAN PUBLIK/REKAYASA SOSIAL LAINNYA

No.	Judul/Tema/Jenis Rekayasa Sosial Lainnya yang telah Diterapkan	Tahun	Tempat Penerapan	Respon Masyarakat
1.	Peningkatan Ekonomi Keluarga Melalui Pemberdayaan Perempuan Pengembang Ekonomi Lokal	2007	Provinsi Jawa Timur (Kab. Trenggalek, Tulungagung, Kediri, Nganjuk dan Bojonegoro)	Sangat Baik
2	Pengkayaan Produk Nata de Coco dengan Variasi Rasa Sari buah	2006	Kec. Tajinan Kab. Malang	Sangat Baik

**VIII. PENGHARGAAN DALAM 10 TAHUN TERAKHIR (dari Pemerintah, asosiasi atau institusi)**

No.	Jenis Penghargaan	Institusi Pemberi Penghargaan	Tahun
1.	Peneliti Terbaik	Univ 17 Agustus 1945 Surabaya	2015
2	Penyaji Terbaik	DP2M Ditjen. Dikti. Depdikbud.	2013
3	Prestasi Akademik	Fakultas Sain dan Teknologi Unair	2012
4.	Penyaji Poster Terbaik	DP2M Ditjen. Dikti. Depdiknas.	2008

Semua data yang saya isikan dan tercantum dalam biodata ini adalah benar dan dapat dipertanggung jawabkan secara hokum. Dan apabila dikemudian hari ternyata dijumpai ketidak sesuaian dengan kenyataan, saya sanggup menerima resikonya.

Demikian biodata ini saya buat dengan sebenarnya untuk memenuhi persyaratan sebagai salah satu syarat pengajuan anggota peneliti pada Hibah Penelitian Kompetensi.

Surabaya, 11 September 2018

Anggota Peneliti,



**Dr. Ir. Wardah, MP., MM**  
196107081989032001

**Lampiran 2.** Susunan organisasi tim peneliti dan pembagian tugas

No	Nama/NIDN	Intansi asal	Bidang ilmu	Alokasi waktu (jam/minggu)	Uraian Tugas
1	Dr. Ir. Tatang Sopandi., MP 0004076302	Univ. PGRI Adi Buana Surabaya	Biologi	8	Mengkoordinasi kegiatan penelitian, melakukan kegiatan pengumpulan bahan penelitian, pemeliharaan dan kondisi biakan, fermentasi monokultur dan kokultur, formulasi pakan, pemeliharaan ternak ayam pedaging, analisis statistika, penyusunan laporan penelitian, penulisan naskah publikasi dan naskah buku
2	Dr. Ir. Wardah., MP.,MM 0008076101	Univ. 17 Agustus 1945 Surabaya	Biologi	8	Pengumpulan bahan penelitian, analisis nutrisi pakan, penyusunan laporan penelitian, penulisan naskah publikasi dan naskah buku

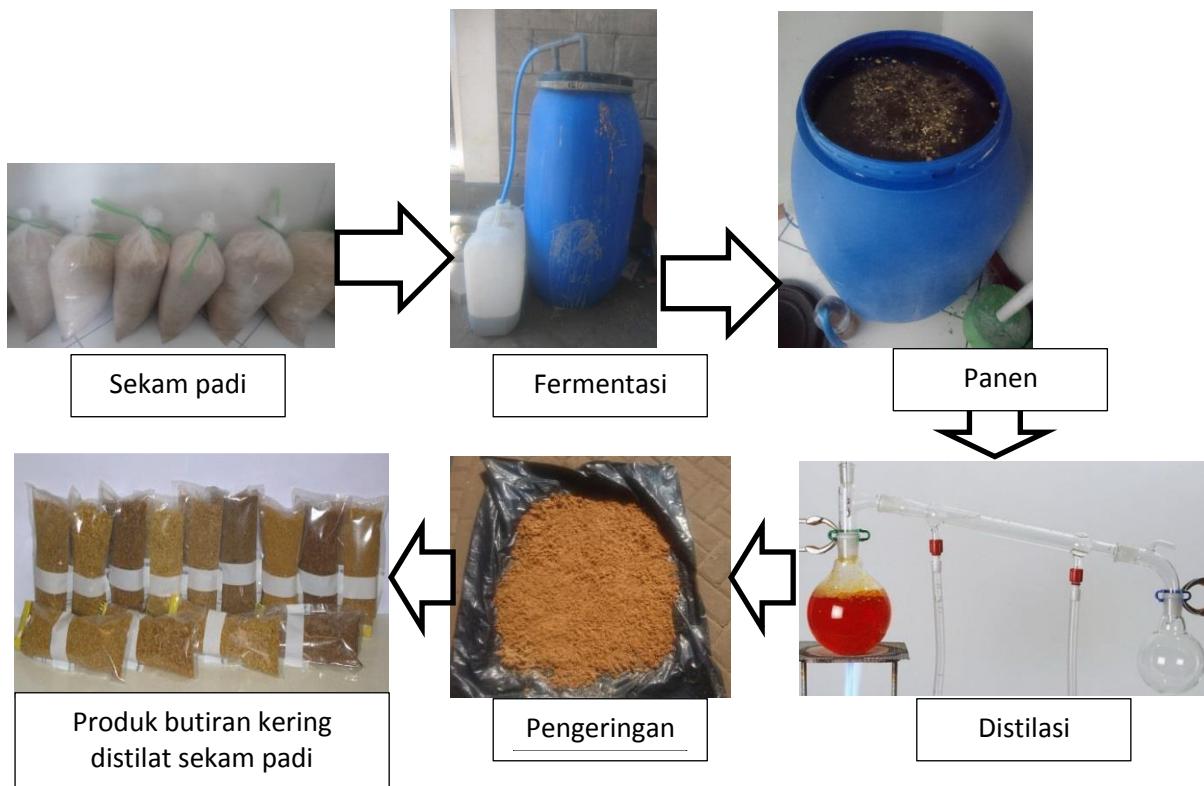
### Lampiran 3. Penggunaan Anggaran Penelitian

KOMPONEN BIAYA		KEGUNAAN	SATUAN	KUANTITAS	JUMLAH	TOTAL
1	<b>HONORARIUM</b>					
	Dr. Ir. Tatang Sopandi, MP	75000		8	35	0
	Dr. Ir. Wardah, MP	75000		8	30	0
2	<b>PERALATAN PENUNJANG</b>	0				0
3	<b>BAHAN HABIS PAKAI</b>					
	Media PDA	Peremajaan dan perbanyakkan isolat khamir	pcs	0.5	1765500	882750
	Urea	Media fermentasi	kg	5	45500	227500
	NaNO <sub>3</sub>	Media fermentasi	kg	5	58500	292500
	KH <sub>2</sub> PO <sub>4</sub>	Media fermentasi	kg	5	65000	325000
	MgSO <sub>4</sub> .7H <sub>2</sub> O	Media fermentasi	kg	5	32500	162500
	NH <sub>4</sub> SO <sub>4</sub>	Media fermentasi	kg	5	45500	227500
	FeCl <sub>3</sub>	Media fermentasi	g	500	7000	3500000
	Erlenmeyer flask	fermentasi	pcs	50	6000	300000
	Petri disk	biakan khamir	pcs	20	71100	1422000
	Kobong (sangkar)	pemeliharaan ternak	pcs	3	133334	400002
	Lampu brooder	pemeliharaan ternak	pcs	12	8000	96000
	Kabel	pemeliharaan ternak	meter	10	2500	25000
	Fiting	pemeliharaan ternak	pcs	12	4000	48000
	Steker	pemeliharaan ternak	pcs	1	5000	5000
	DOC	Bibit ternak	ekor	100	7000	700000
	Dedak	Pakan ternak	kg	10	8000	80000
	Milet	Pakan ternak	kg	50	4000	200000
	Beras jagung	Pakan ternak	kg	50	6600	330000
	Pakan 511 B	Pakan ternak	kg	100	7090	709000
	Pakan 592	Pakan ternak	kg	50	7750	387500
	Tepung ikan	Pakan ternak	kg	50	6000	300000
	Bungkil kedele	Pakan ternak	kg	25	7000	175000
	Tepung tulang	Pakan ternak	kg	2.5	4000	10000
	Prosesing pakan	Pakan ternak	kg	120	13334	1600080
	Penepung	Pembuatan butiran kering distilat sekam padi pakan ternak	pcs	1	377000	377000
	Obat dan vaksin	pemeliharaan ternak	pcs	1	12500	12500

KOMPONEN BIAYA		KEGUNAAN	SATUAN	KUANTITAS	JUMLAH	TOTAL
	Biaya pemeliharaan laboratorium fisiologi hewan	pemeliharaan ternak	hari	45	25000	1125000
	Tenaga kerja	pemeliharaan ternak	hari	80	25000	2000000
	HgO, reagent grade	Analisis protein	mg	25	75000	1875000
	K <sub>2</sub> SO <sub>4</sub> , reagent grade	Analisis protein	kg	0.5	1170000	585000
	H <sub>2</sub> SO <sub>4</sub> (98%), nitrogen free.	Analisis protein/Serat kasar	g	500	7000	3500000
	Kertas saring Whatman No.1	Analisis kalsium	pcs	10	250000	2500000
	Paraffin wax	Analisis protein	kg	1	1947400	1947400
	NaOH	Analisis protein/serat kasar/kalsium	g	1000	1300	1300000
	Na <sub>2</sub> SO <sub>4</sub>	Analisis protein	g	500	1950	975000
	Boric acid	Analisis protein	g	500	7150	3575000
	methyl red	Analisis protein	pcs/25 gr	2	1189500	2379000
	bromocresol green	Analisis protein	pcs/25 gr	2	1467500	2935000
	HCl	Analisis protein/serat kasar/Kalsium/fosfor	liter	5	39000	195000
	Petroleum ether	Analisis lemak/serat kasar	ml	250	6520	1630000
	Iso amil alkohol	Analisis serat kasar	ml	100	7800	780000
	Etil alkohol	Analisis serat kasar	liter	100	6800	680000
	asam perkhlorat (HClO <sub>4</sub> )	Analisis abu	ml	50	7600	380000
	AgNO <sub>3</sub>	Analisis kalsium/fosfor	g	25	84500	2112500
	indikator calcon	Analisis kalsium	g	25	75000	1875000
	standar EDTA	Analisis kalsium	g	50	11700	585000
	Aquades	Media/ Analisis fosfor/kalsium	liter	220	6500	1430000
	HNO <sub>3</sub>	Analisis fosfor/abu	liter	2.5	624000	1560000
	Vanadate-molybdate reagent	Analisis fosfor	g	25	38000	950000
	Molybdat	Analisis fosfor	g	10	105000	1050000
	spektrofotometer,	Analisis kalsium	jam	25	130000	3250000
	Penangas air	Analisis KH	jam	30	20000	600000
	Dietil eter	Analisis lemak	ml	500	10800	5400000
	anthrone	Analisis energi	pcs/10 g	1	1975000	1975000
	Natrium karbonat	Analisis energi	kg	0.5	2335000	1167500

KOMPONEN BIAYA		KEGUNAAN	SATUAN	KUANTITAS	JUMLAH	TOTAL
	Biaya pemeliharaan laboratorium mikrobiologi	Penelitian	hari	60	25000	1500000
	Analisis data	Penelitian	paket	5	4000000	20000000
	Kertas	Pembuatan laporan kemajuan	rim	2	31000	62000
	Tinta	Pembuatan laporan	pcs	1	250000	250000
	Foto copy	Pembuatan laporan	lembar	150	200	30000
	Penjilidan	Pembuatan laporan kemajuan dan laporan akhir	pcs	6	9000	54000
<b>4</b>	<b>PERJALANAN DINAS</b>					
	Surabaya - malang					
	Transportasi	Analisis sample	orang	2	200000	400000
	Uang harian 2 peneliti	Analisis sample	orang	2	410000	820000
	Pajak ppn 10%	Pembelian barang	paket			8485523
	Pajak pph 2%	Upah dan jasa tanaga kerja	paket			438900
	<b>PENGGUNAAN DANA</b>					<b>95001855</b>

**Lampiran 4.** Proses fermentasi sekam padi



Lampiran 5. Pemeliharaan ayam, pengamatan bobot badan dan karkas



## Lampiran 6. Proses publikasi

The screenshot shows an email inbox with the following details:

- Email Masuk 257**
- Tulis**
- Kembali** **Ansipkan** **Pindahkan** **Hapus** **Spam**
- Acknowledgement of a New Manuscript**
- Science Alert <support@scialert.com>**
- Kepada: Tatang Sopandi**
- Received on: October 01, 2018**
- Manuscript No.: 92278-IJPS-ANSI**
- Submitted to: International Journal of Poultry Science**
- Title: Production Performance and Carcass Percentage of Broilers Fed Distillers Dried Grain From rice Husks With Co-culture Fermentation of *Saccharomyces cerevisiae* With *Candida tropicalis***
- Dear Tatang Sopandi,**
- Thank you very much for submitting your above mentioned manuscript. Your paper has been assigned with an ID of 92278-IJPS-ANSI. Please refer to this ID whenever you communicate with our Editorial Office in the future.**
- Your paper will undergo the NORMAL REVIEW PROCESS of the Journal. The process normally takes 3 to 4 weeks to complete depending on the number of rounds the reviews need to take place.**
- Please do expect slight delay if the review period overlaps with a long holiday or Summer/Winter break.**
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- Regard,  
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International Journal of Poultry Science**

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Science Alert <support@scialert.com> Kepada: Tatang Sopandi 1 Nov jam 23:29

Dear Tatang Sopandi

This is with regard to your submitted manuscript, 92278-IJPS-ANSI, titled Production Performance and Carcass Percentage of Broilers Fed Distillers Dried Grain From rice Husks With Co-culture Fermentation of *Saccharomyces cerevisiae* With *Candida tropicalis*, submitted to International Journal of Poultry Science on October 01, 2018 for consideration as a Research Article.

The article has been accepted for publication after revision. A Peer Review report is available online and corresponding author can access this report after log in to his/her account.

It is therefore requested to please submit revised version of your article urgently for further processing.

Please let us know when we can expect the revised version of your manuscript.

We look forward to hearing from you.

Regard  
Academic Editor  
International Journal of Poultry Science

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# **Production Performance and Carcass Percentage of Broilers Fed Distillers Dried Grain From rice Husks With Co-culture Fermentation of *Saccharomyces cerevisiae* With *Candida tropicalis***

By:  
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## **Abstract**

**Background and Objective:** Distillers dried grains of bioethanol production can be used as an alternative source of energy and protein for poultry feed. Sources of raw material for energy are very important to reduce the cost of poultry feed. The present study aims to find the proportion of distillers dried grains from a rice husk with co-culture fermentation of *Saccharomyces cerevisiae* with *Candida tropicalis* as feed ingredients for broiler chickens to replace corn. **Materials and Methods:** One hundred day-old chicks (DOC) were used in the present study. The experiment used a completely randomized design (CRD) with 6 treatments and different replications. Six formulations of treatment feed were made for the starter and finisher periods, each consisting of 0, 5, 10, 15, 20 and 25% rice husk DDG in broiler chicken rations. In the present study, the composition of DDG nutrients and formulated feed were analyzed according to AOAC recommendations. **Results:** Corn substitution with rice husk DDG up to a proportion of 15% does not negatively affect the growth and weight of harvest, feed consumption and feed conversion, carcass, liver organ and gastrointestinal tract percentage and nitrogen retention of broiler chicken. However, replacement of corn with 20-25% rice husk DDG can decreases growth and harvest weight, feed conversion and nitrogen retention of broiler chicken. **Conclusion:** The rice husk DDG can be used as a formulation material and replaces 15% corn in broiler chicken rations.

Key words: distillers dried grain, rice husk, *Saccharomyces cerevisiae*, *Candida tropicalis* broiler chicken, and ration

## INTRODUCTION

Lignocellulose biomass is an ideal raw material for the production of bioethanol as a liquid fuel that can be ordered<sup>1</sup>. Conversion of lignocellulose biomass including agricultural waste to bioethanol is an important choice for exploiting alternative energy sources and reducing air pollution<sup>2,3</sup>.

The development of the bioethanol industry can produce by-products that are quantitatively potential as raw material for other industries including the animal feed industry. Utilization of distillers dried grains for various purposes including as raw material for livestock is very important to maximize the benefits of the bioethanol industry<sup>4</sup>. Distillers dried grains as the main by-product of bioethanol production are known to be sources of protein, energy, water soluble vitamins and minerals and good amino acids for poultry<sup>5,6,7</sup>. Distillers dried grains of bioethanol production can be used as an alternative source of energy and protein for poultry feed<sup>8</sup>.

The previous study indicated that co-culture *Saccharomyces cerevisiae* with *Candida tropicalis* can produce bioethanol from rice husk<sup>9,10</sup>. However, research on the potential use of distillers dried grains from rice husk fermentation by co-culture *S. cerevisiae* with *C. tropicalis* as animal feed, especially poultry has never been carried out. Sources of raw material for energy are very important to reduce the cost of poultry feed<sup>11</sup>. Feed energy costs can reach 70% of the total cost of feed<sup>12</sup>. Distillers dried grain is generally used in poultry feed which functions as dietary energy, digestible amino acids, and bioavailable phosphorus and can reduce the use of corn, soybean meal, and inorganic phosphorus<sup>13</sup>. Increasing prices and non-availability of corn as a source of feed energy encourage poultry nutritionists to look for alternative energy sources for corn<sup>14</sup>. The present study aims to find the proportion of

distillers dried grain from a rice husk a co-culture fermentation of *S. cerevisiae* with *C. tropicalis* as feed ingredients for broiler chickens to replace corn.

## MATERIALS AND METHOD

The present study was conducted at the Laboratory of Animal Physiology, Department of Biology, Faculty of Mathematical and Natural Science, University of PGRI Adi Buana Surabaya, Indonesia, in April – June 2018.

**Preliminary treatment of rice husks:** Local farm-sourced rice husks from Sidoarjo, Indonesia were air dried for 2 days and then ground to approximately 2-mm-diameter particles using a grinder mill. The milled rice husks were steamed at 130°C for 3 hours, cooled to room temperature, mixed with 0.25% H<sub>2</sub>SO<sub>4</sub> and autoclaved for 15 min at 121°C. The rice husk hydrolysate was cooled and stored at 1°C to 5°C in the dark until it was used.

**Fermentation:** The rice husks hydrolysate is dissolved in water, filtered in cotton cloth, and the filtrate is dried. A total of 5 kg of rice husks hydrolysate was added to a 100 l plastic drum added 1.0 molasses, 1.0 kg fish meal, 60.0 g NaNO<sub>3</sub>, 100 g NH<sub>4</sub>NO<sub>3</sub>, 20.0 g KH<sub>3</sub>PO<sub>4</sub> and 14.0 g MgSO<sub>4</sub>• 7H<sub>2</sub>O and sterile water until the volume reached 100 l. The mixture was then stirred and the pH of the medium was adjusted by adding NaOH until the pH reached 5.5, tightly closed and left for 24 hours. The mixture of medium was inoculated with 2 l of starter culture containing 10<sup>6</sup> ml<sup>-1</sup> of *S. cerevisiae* and 10<sup>6</sup> ml<sup>-1</sup> of *C. tropicalis* spores. The inoculated media was incubated for 7 days at 28-30°C, 60-70% relative humidity in the dark. After fermentation, medium was harvested and distilled at 70-75°C until thick and dried at 60°C, ground in miller and then sieved to obtain DDG meal. The fermentation process with new media is carried out repeatedly until distillers dried grain reaches approximately 75 kg. Distillers dried grain (DDG) rice husks was analyzed for proximate composition in accordance with Association of Official Analytical Chemists (AOAC)<sup>15</sup> recommendations consists of dry matter, crude protein, crude fat, carbohydrates, calcium and phosphorus.

**Feed formulation:** Broiler rations were formulated to replace part of the corn with rice husk DDG according to the range of broiler nutritional requirement as recommended by National Research Council (NRC)<sup>15</sup>. All feed ingredients in dry conditions were mixed and made in the form of granules for starter broiler (days 1-21) and pellets for the finisher period (days 22-42). A total of 6 feed formulations for starter and finisher broiler were made in this study with the proportion of rice husk DDG 0 (A), 5 (B), 10 (C), 15 (D), 20 (E), and 25% (F). Each feed formulation was analyzed for proximate composition in accordance with AOAC recommendations consists of dry matter, crude protein, crude fat, carbohydrates, calcium and phosphorus.

**Experimental design:** This study was conducted in a completely randomized design (CRD) with 6 treatments of feed formulations (0, 5, 10, 15, 20, and 25% DDG in diets) and different replications. One hundred day old chicks (DOC) were randomly divided into 6 groups. The first four groups (A, B, C, and D) each consisted of 17 heads broilers and 2 second groups (E and F) each consisting of 16 heads. Each group was given formulated feeds (0, 5, 10, 15, 20 and 25% DDG) for both the starter and finisher period feed. All chickens were kept in individual cages bamboos (30 x 30 X 30 cm) for 42 days at 27-28°C. The birds were vaccinated at 4 days (eye drops), 14 and 21 days (intramuscular) against Newcastle disease. Each cage was equipped with a plastic feeder and a plastic drinker. The experimental diets and water were offered for *ad libitum* consumption.

**Data collection:** Collected data were feed intake ( $\text{kg head}^{-1}$ ), live weight ( $\text{kg head}^{-1}$ ), feed conversion, carcass percentage (% live weight  $\text{head}^{-1}$ ), liver organ (% live weight  $\text{head}^{-1}$ ), gut tract (% live weight  $\text{head}^{-1}$ ) and nitrogen retention (%) of broilers. Feed intake and live weight of broiler were recorded weekly to assess feed conversion. Carcass, liver organ, gastrointestinal tract percentage were recorded at 41 days and nitrogen retention (%) was recorded at 40 days of rearing.

**Data analysis:** All observational data were analyzed using one-way analysis of variance for complete randomized design at 5% level of significance ( $P<0.05$ ). Further test was carried out by Tukey's test to determine differences among treatments if the treatment has a significant effect ( $P<0.05$ ) on the observational variable.

## RESULTS.

**Nutritional composition of rice husk DDG:** Nutritional composition of DDG from rice husks with co-culture fermentation of *S. cerevisiae* with *C. tropicalis* is shown in Figure. 1. The rice husk DDG shows high carbohydrate (57.51%) but low in crude protein (9.43%) content. DDG rice husk also shows high fat, calcium and phosphorus content.

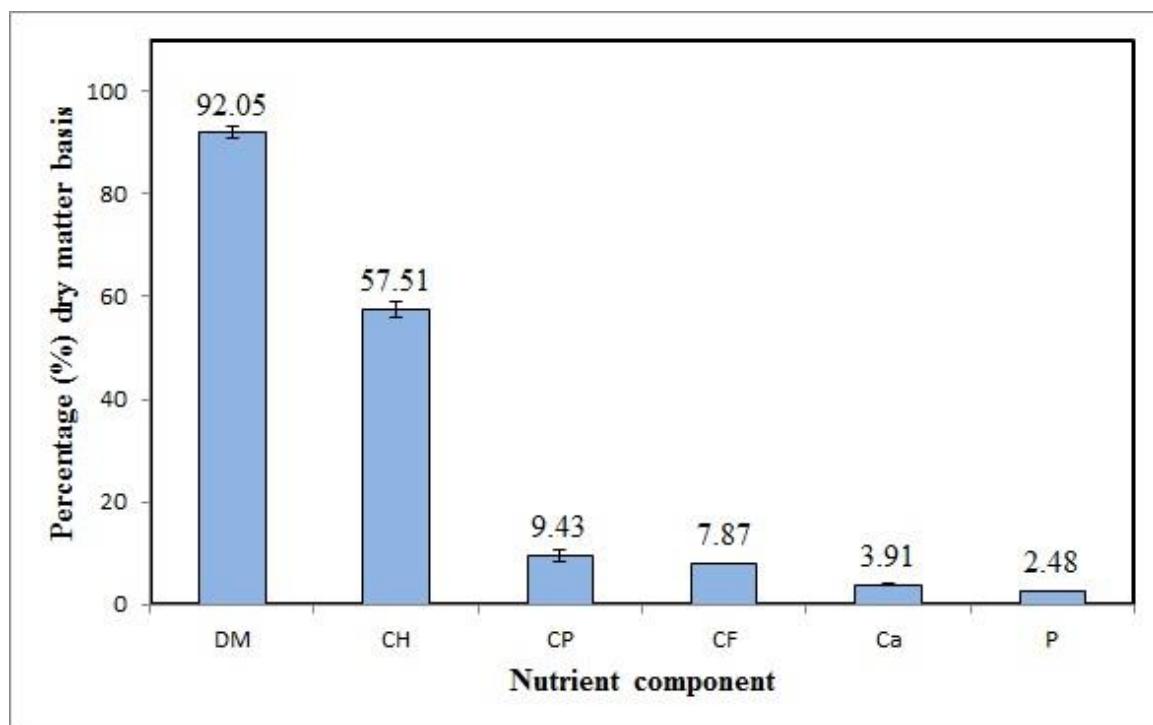


Figure 1. Nutrient composition of rice husk DDG, DM: dry matter, CH: Carbohydrate, CP: crude protein, CF: crude fat, Ca: calcium, P: phosphorus

**Formulation and nutrient ration:** Ingredient and nutritional composition of the experimental diets fed to broilers from 1 to 21 days of age is shown in Table 2. Gradual

replacement of corn with rice husk DDG in starter period of ration formulations decreases crude protein levels but increases carbohydrates, crude fat and energy.

Ingredient and nutritional composition of the experimental diets fed to broilers from 22 to 42 days of age is shown in Table 2. Like the starter period ration, the gradual replacement of corn with rice husk DDG in the finisher period of ration formulation decreases crude protein content but increases carbohydrate, crude fat and energy.

Table 1. Ingredient and nutritional composition of the experimental diets fed to broilers from 1 to 21 days of age (starter period).

Ingredient	Formulation					
	A	B	C	D	E	F
Rice bran (%)	1.00	1.00	1.00	1.00	1.00	1.00
Yellow corn (%)	50.00	45.00	40.00	35.00	30.00	25.00
Soybean meal (%)	10.00	10.00	10.00	10.00	10.00	10.00
Pearl millet (%)	1.00	1.00	1.00	1.00	1.00	1.00
Distiller dried grain (%)	0.00	5.00	10.00	15.00	20.00	25.00
Local fish meal (%)	25.00	25.00	25.00	25.00	25.00	25.00
Meat bone meal	11.50	11.50	11.50	11.50	11.50	11.50
Topmix (%)*)	1.40	1.40	1.40	1.40	1.40	1.40
Bone meal (%)	0.10	0.10	0.10	0.10	0.10	0.10
Nutritional composition						
Crude protein (%)	22.24	21.96	20.92	19.68	19.64	19.27
Crude fat (%)	3.19	3.69	3.75	3.97	4.05	4.15
Carbohydrate (%)	46.27	49.08	49.25	49.33	49.72	51.66
Calcium (%)	2.18	2.24	2.29	2.34	2.4	2.45
Phosphorus (%)	1.66	1.69	1.73	1.76	1.79	1.82
Energy (Kcal kg <sup>-1</sup> )**)	3027.50	3173.70	3144.30	3117.70	3138.90	3210.70

\*) Topmix composition per kg as follows: vitamin A, 1,000,000 IU; vitamin B12 , 400 mg; vitamin D, 100,000 IU;DL-methionine, 22,700 mg; vitamin E, 700 mg; antioxidant , 12,500 mg, vitamin K3, 100 mg, Mg, 5.000 mg; vitamin B1, 100 mg; Fe, 1,000 mg; vitamin B2, 600 mg, Cu, 200 mg; vitamin B6, 50 mg, Mn,1,500 mg; Niacin 1,000 mg; Zn, 1,000 mg; Panthothenic acid, 50 mg; I, 10 mg, and Choline cloriene, 1.000 mg

\*\*)Calculated

**Live weight:** Present study showed that the use of rice husk DDG in the experimental ration significantly ( $P<0.05$ ) decreased the live weight of broiler chickens. At ages 3 to 6 weeks (Table

3), the live weight of broiler chickens fed 25% proportion of rice husk DDG was significant ( $P < 0.05$ ) lower than 0, 5, 10, 15 and 20%. There were no significant ( $P > 0.05$ ) differences in live weight of broilers fed 0, 5, 10, 15, and 20% proportion of rice husk DDG, but 25% was significantly ( $P < 0.05$ ) lower than the others.

Table 2. Ingredient and nutritional composition of the experimental diets fed to broilers from 22 to 42 days of age (finisher period).

Ingredient	Formulation					
	A	B	C	D	E	F
Rice bran (%)	2.50	2.50	2.50	2.50	2.50	2.50
Yellow corn (%)	60.00	55.00	50.00	45.00	40.00	35.00
Soybean meal (%)	11.00	11.00	11.00	11.00	11.00	11.00
Pearl millet (%)	3.00	3.00	3.00	3.00	3.00	3.00
Distiller dried grain (%)	0.00	5.00	10.00	15.00	20.00	25.00
Local fish meal (%)	20.00	20.00	20.00	20.00	20.00	20.00
Meat bone meal	2.00	2.00	2.00	2.00	2.00	2.00
Topmix (%)*)	1.40	1.40	1.40	1.40	1.40	1.40
Bone meal (%)	0.10	0.10	0.10	0.10	0.10	0.10
Nutritional composition						
Crude protein (%)	19.56	19.72	18.58	18.49	18.76	18.15
Crude fat (%)	2.98	4.17	4.39	4.53	4.51	4.69
Carbohydrate (%)	49.31	52.08	55.97	57.68	58.78	61.06
Calsium (%)	2.2	2.78	2.91	3.29	3.53	3.71
Phosphorus (%)	1.25	1.48	1.74	1.82	1.95	2.14
Energy (Kcal kg <sup>-1</sup> )**)	3023.00	3247.30	3377.10	3454.50	3507.50	3590.50

\*) Topmix composition per kg as follows: vitamin A, 1,000,000 IU; vitamin B12 , 400 mg; vitamin D, 100,000 IU; DL-methionine, 22,700 mg; vitamin E, 700 mg; antioxidant , 12,500 mg, vitamin K3, 100 mg, Mg, 5.000 mg; vitamin B1, 100 mg; Fe, 1,000 mg; vitamin B2, 600 mg, Cu, 200 mg; vitamin B6, 50 mg, Mn, 1,500 mg; Niacin 1,000 mg; Zn, 1,000 mg; Panthenic acid, 50 mg; Iodine, 10 mg, and Choline cloriene, 1.000 mg  
\*\*) Calculated

**Feed intake:** Table 4 shows feed intake of broiler chicken fed different proportion of rice husk DDG ration. Feed intake of broiler chicken was not significantly ( $P > 0.05$ ) affected by the proportion of rice husk DDG.

**Feed conversion:** Table 5 shows that feed conversion was significantly ( $P<0.05$ ) affected by the proportion of rice husk DDG in the ration. There were no significant ( $P>0.05$ ) differences in feed conversion of broilers fed 0, 5, 10, and 15% proportion of rice husk DDG, but 25% was significantly ( $P<0.05$ ) higher than 0, 5, 10, and 15% of rice husk DDG. Feed conversion of broiler in the proportion of 20% rice husk DDG at week 2, 3 and 6 was not significantly ( $P>0.05$ ) different from 0, 5, 10, 15, 20 and 25%. However, at weeks 4 and 6, feed conversion of broiler in the proportion of 20 and 25% rice husk DDG was significantly ( $P<0.05$ ) higher than 0, 5, 10, and 15%.

Table 3. Live weight of broiler chickens fed different proportion of rice husk DDG

Proportion of rice husk DDG (%)	Live weight DOC (kg head <sup>-1</sup> )	Live weight (kg head <sup>-1</sup> ) of the week					
		1	2	3	4	5	6
0	0.03 <sup>a</sup>	0.13 <sup>a</sup>	0.32 <sup>a</sup>	0.55 <sup>a</sup>	0.96 <sup>a</sup>	1.48 <sup>a</sup>	1.76 <sup>a</sup>
5	0.03 <sup>a</sup>	0.12 <sup>a</sup>	0.33 <sup>a</sup>	0.52 <sup>a</sup>	0.95 <sup>a</sup>	1.49 <sup>a</sup>	1.78 <sup>a</sup>
10	0.04 <sup>a</sup>	0.12 <sup>a</sup>	0.34 <sup>a</sup>	0.51 <sup>a</sup>	0.93 <sup>a</sup>	1.46 <sup>a</sup>	1.74 <sup>a</sup>
15	0.03 <sup>a</sup>	0.11 <sup>a</sup>	0.31 <sup>a</sup>	0.50 <sup>a</sup>	0.92 <sup>a</sup>	1.51 <sup>a</sup>	1.73 <sup>a</sup>
20	0.04 <sup>a</sup>	0.11 <sup>a</sup>	0.29 <sup>a</sup>	0.49 <sup>a</sup>	0.88 <sup>ab</sup>	1.49 <sup>a</sup>	1.71 <sup>a</sup>
25	0.03 <sup>a</sup>	0.09 <sup>a</sup>	0.29 <sup>b</sup>	0.46 <sup>b</sup>	0.85 <sup>b</sup>	1.39 <sup>b</sup>	1.62 <sup>b</sup>

Data presented as the means of 16-17 replication (N=16-17 bird each). <sup>a-b</sup> values in the same column with different superscripted letters are significantly different ( $P<0.05$ ).

Table 4. Feed intake of broiler chickens fed different proportion of rice husk DDG

Proportion of rice husk DDG (%)	Accumulation feed intake (kg head <sup>-1</sup> ) at week					
	1	2	3	4	5	6
0	0.133	0.394	0.743	1.469	2.708	3.467
5	0.126	0.422	0.723	1.501	2.771	3.524
10	0.125	0.432	0.719	1.460	2.759	3.428
15	0.120	0.400	0.760	1.500	2.929	3.495
20	0.122	0.389	0.794	1.505	2.950	3.642
25	0.119	0.320	0.759	1.496	2.794	3.532

Data presented as the means of 16-17 replication (N=16-17 bird each).

Table 5. Feed conversion of broiler chickens fed different proportion of rice husk DDG

Proportion of rice husk DDG (%)	Feed convertin at week					
	1	2	3	4	5	6
0	1.02 <sup>a</sup>	1.23 <sup>a</sup>	1.35 <sup>a</sup>	1.53 <sup>a</sup>	1.83 <sup>a</sup>	1.97 <sup>a</sup>
5	1.05 <sup>a</sup>	1.28 <sup>a</sup>	1.39 <sup>a</sup>	1.58 <sup>a</sup>	1.86 <sup>a</sup>	1.98 <sup>a</sup>
10	1.04 <sup>a</sup>	1.27 <sup>a</sup>	1.41 <sup>a</sup>	1.57 <sup>a</sup>	1.89 <sup>a</sup>	1.97 <sup>a</sup>
15	1.09 <sup>a</sup>	1.29 <sup>a</sup>	1.52 <sup>a</sup>	1.63 <sup>a</sup>	1.94 <sup>a</sup>	2.02 <sup>a</sup>
20	1.11 <sup>a</sup>	1.34 <sup>ab</sup>	1.62 <sup>ab</sup>	1.71 <sup>b</sup>	1.98 <sup>ab</sup>	2.13 <sup>b</sup>
25	1.13 <sup>a</sup>	1.39 <sup>b</sup>	1.65 <sup>b</sup>	1.76 <sup>b</sup>	2.01 <sup>b</sup>	2.18 <sup>b</sup>

Data presented as the means of 16-17 replication (N=16-17 bird each). <sup>a-b</sup> values in the same column with different superscripted letters are significantly different ( $P<0.05$ ).

**Carcass percentage:** Figure 2 shows carcass percentage of broiler chicken fed different proportion of rice husk DDG in ration. The carcass percentage of broiler chicken was not significantly ( $P>0.05$ ) affected by the proportion of rice husk DDG.

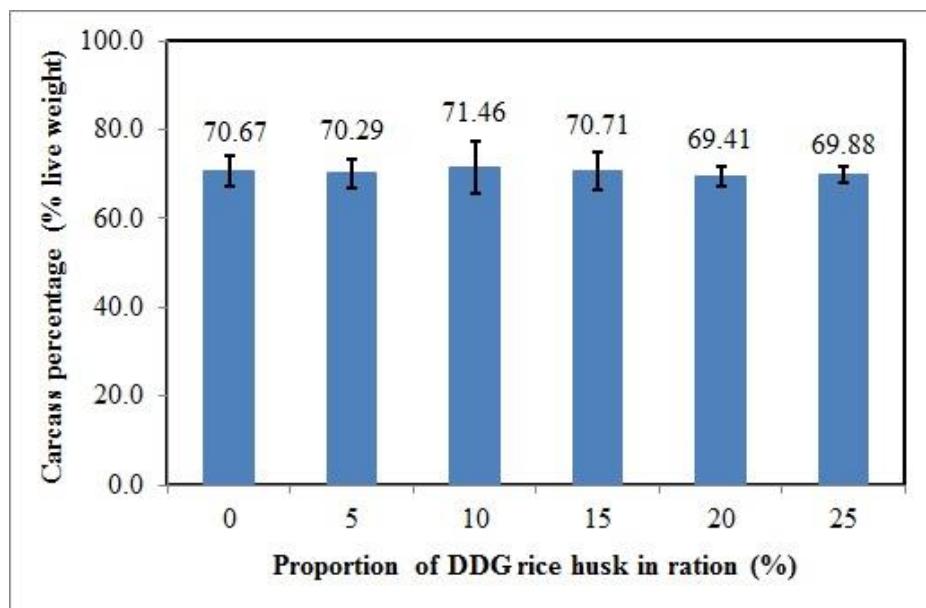


Figure 2. Carcass percentage of broiler chicken fed rice husk DDG in ration. Data presented as the means of 16-17 replication (N=16-17 bird each).

**Liver organ:** Figure 3 shows liver organ percentage of broiler chicken fed different proportion of rice husk DDG in ration. The liver organ percentage of broiler chicken was not significantly ( $P>0.05$ ) affected by the proportion of rice husk DDG in ration.

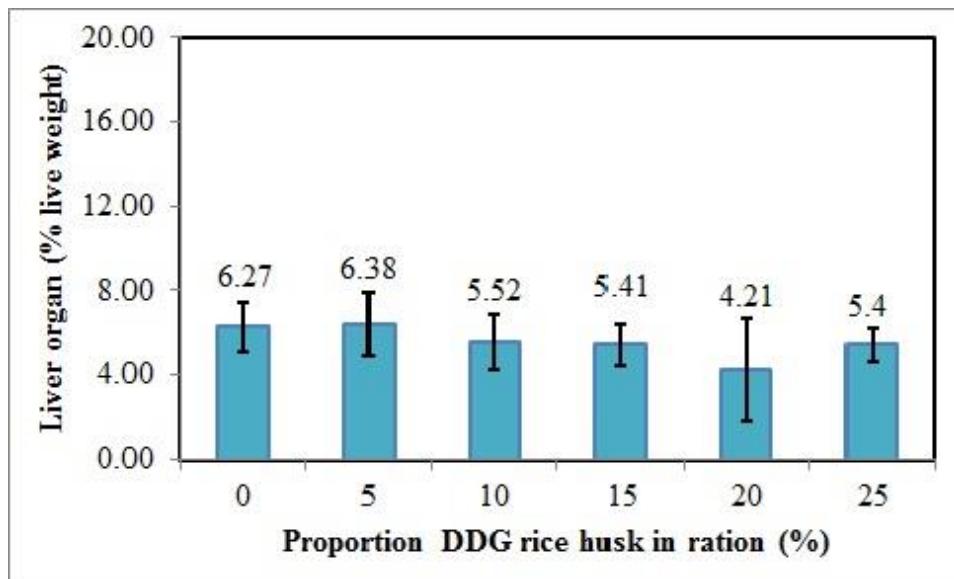


Figure 3. Liver organ percentage of broiler chicken fed rice husk DDG. Data presented as the means of 16-17 replication (N=16-17 bird each).

**Gastrointestinal tract :** Figure 4 shows gastrointestinal tract of broiler chicken fed different proportion of rice husk DDG in ration. The gastrointestinal tract of broiler chicken was not significantly ( $P>0.05$ ) affected by the proportion of rice husk DDG in ration.

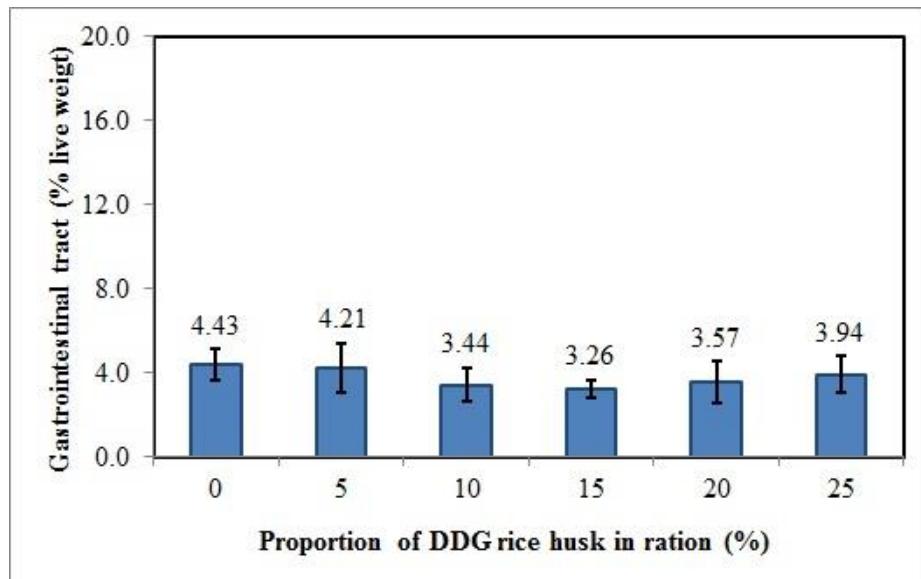


Figure 4. Gastrointestinal tract percentage of broiler chicken fed rice husk DDG in ration. Data presented as the means of 16-17 replication (N=16-17 bird each).

**Nitrogen retention:** Table 6 shows that nitrogen retention was significantly ( $P<0.05$ ) affected by the proportion of rice husk DDG in the ration. There were no significant ( $P>0.05$ )

differences in nitrogen retention of broilers fed 0, 5, 10, and 15 proportion of rice husk DDG, but 25% was significantly ( $P<0.05$ ) lower than 0, 5, 10, 15 and 20%.

Table 6. Nitrogen retention of broiler chickens fed different proportion of rice husk DDG in ration

Proportion of rice husk DDG (%)	Nitrogen consumption (kg)	Nitrogen in faeces (kg)	Nitrogen retention
0	0.085 <sup>a</sup>	0.048 <sup>a</sup>	56.47 <sup>a</sup>
5	0.087 <sup>a</sup>	0.049 <sup>a</sup>	56.32 <sup>a</sup>
10	0.082 <sup>a</sup>	0.046 <sup>a</sup>	56.10 <sup>a</sup>
15	0.087 <sup>a</sup>	0.048 <sup>a</sup>	55.17 <sup>a</sup>
20	0.089 <sup>a</sup>	0.049 <sup>a</sup>	55.06 <sup>a</sup>
25	0.081 <sup>b</sup>	0.044 <sup>b</sup>	54.32 <sup>b</sup>

Data presented as the means of 6 replication (N=16-17 birds each). <sup>a-b</sup> values in the same column with different superscripted letters are significantly different ( $P<0.05$ ).

## DISCUSSION

The present study indicates that the crude protein content of distillers dried grain (DDG) from rice husks with co-culture fermentation of *Saccharomyces cerevisiae* with *Candida tropicalis* is low, but the content of energy, calcium and phosphorus are high. The calculated rice husk DDG energy content is 3385.50 kcal kg<sup>-1</sup>. Some researchers report variations in the composition of DDG nutrients. Shurson *et al.*<sup>17</sup> reported that corn DDG contained 29.2% crude protein, 3065 kcal/kg metabolic energy, 0.04% calcium and 0.83% phosphorus. Ning *et al.*<sup>11</sup> reported that distiller dried grain with soluble (DDGS) corn contented 27.81% crude protein and 4.94 Mcal kg<sup>-1</sup> metabolic energy. Meanwhile, wheat bran DDGS contained 18.82% crude protein and 4.09 Mcal kg<sup>-1</sup> metabolic energy. Distiller dried grain of corn contained 89.48-94% dry matter<sup>16,18,19</sup>, 23.0-53.39% crude protein<sup>19,20,21</sup> and 2146-3554 kcal kg<sup>-1</sup> metabolic energy<sup>16,19,22,23</sup>. Belyea *et al.*<sup>24</sup> and Shurson *et al.*<sup>25</sup> suggested that the composition of DDG nutrients varied greatly and influenced by fermentation processes, raw materials and microorganisms.

The present study indicates that the nutritional composition of all experimental feed formulations was in accordance with the range of nutritional composition recommended by NRC<sup>16</sup>. However, the replacement of corn by rice husk DDG decreases the crude protein content but increases the metabolic energy content of the experimental ration. The high proportion of rice husk DDG to replace corn produces low levels of crude protein and high metabolic energy in rations. It was assumed that the rice husk DDG crude protein content in this study was lower than the yellow corn. Lalujan *et al.*<sup>26</sup> reported that the crude protein content of the local corn yellow was 10-11%. Sudiastria and Suasta<sup>27</sup> reported that the crude protein of corn yellow was 14.35%. It was assumed that the rice husk DDG metabolic energy content in this study was higher than the yellow corn. Sudiastria and Suasta<sup>27</sup> also reported that the metabolic energy of corn yellow was 3294 kcal kg<sup>-1</sup>.

The present study indicated that replacing corn with 15% rice husk DDG did not reduce the growth performance and harvest weight of broiler chickens. Decreased growth of broiler chickens appears on corn replacement by 20-25%. This decrease occurs due to a decrease in crude protein levels in the ration. The proportion of DDG in broiler chicken rations that has been reported by several researchers varies. Cortes-Cuevas *et al.*<sup>28</sup> reported that the use of 6% or 12% corn DDG did not significantly affect the production performance of broiler chicken. The use of corn DDG in broiler and laying rations can reach 15%<sup>7,29</sup>. The corn DDG can be used in poultry feed up to 20% as long as nutritional profiles, especially amino acids, are sufficient in the ration<sup>30,31,32</sup>.

This study indicates that corn replacement with 5-25% rice husk DDG does not significantly influence on feed intake of broiler chicken. However, replacing corn with 25% rice husk DDG significantly increases feed conversion. The results of this study are different from Thacker and Widjyatne<sup>33</sup> who reported that no significant differences were observed in feed intake and feed conversion ratio of broiler chickens fed 20.0% wheat DDGS. However,

Wang *et al.*<sup>5</sup> reported that feeding 25.5% DDGS increased feed intake and decreased feed conversion ratio.

The present study indicated that the replacement of corn with 5-25% rice husk DDG did not negative affect the carcass, liver organ and gastrointestinal tract percentage of broiler chicken. These results are in agreement with Wang *et al.*<sup>5</sup> who reported that birds fed diets with 15% DDGS did not differ significantly in dressing percentage. Also Choi *et al.*<sup>34</sup> reported that, there was no negative effect of DDGS supplementation up to 15% on meat qualities.

The present study indicates that replacing corn with 25% rice husk DDG decreases nitrogen retention. This was presumably due to the crude protein content and nitrogen consumption in the formulation of 25% rice husk DDG lower than 0, 5, 10, 15 and 20%. Low nitrogen consumption causes low nitrogen retention in broiler chickens. In previous studies, Leytem *et al.*<sup>35</sup> and Applegate *et al.*<sup>21</sup> also have reported linear decreases in nitrogen retention with increasing wheat DDGS levels in broiler diets.

In general, this study agrees with several previous studies which reported that the proportion of 15% DDG in the diet did not have a negative effect on growth performance, carcass percentage and nitrogen retention of broiler chicken. Previous studies (Waldroup *et al.*<sup>36</sup>, Wang *et al.*<sup>5</sup>, and Youssef *et al.*<sup>37</sup>) agree with the use of 15% DDG in the diet of broiler chicken.

## SIGNIFICANCE STATEMENT

This study discovers that distiller dried grain from rice husk with co-culture fermentation of *S. cerevisiae* with *C. tropicalis* can utilize as feedstock for the preparation of broilers diet. This study will help the researchers to uncover the critical area of using distiller dried grain in broiler diet as feed stock.

## CONCLUSION

The present study has concluded that feeding the proportion of 15% rice husk DDG in rations does not have a negative effect on production performance and the percentage of broiler carcasses. The distiller dried grain from rice husk with co-culture fermentation of *S. cerevisiae* with *C. tropicalis* can replace 15% of the proportion of corn in broiler chicken rations.

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## Conflict of Interest

No conflict of interest declared. All authors read and approved the final version of the manuscript.

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# **MIKOLOGI**

## **Dasar dan Aplikasi**



**Oleh:**  
**Tatang Sopandi**  
**dan Wardah**

**2019**

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